ERDI LASER®

1535nm eyesafe Laser Rangefinder Module 0815C
Model:LRF0815C

ᴙ OVERVIEW

The LRF0815C laser rangefinder boasts eye-safety, a compact design, lightness, energy efficiency, durability, and a broad temperature range. Its versatility shines in reconnaissance, surveying, and mapping tasks. This module, shell-free and interfaced with a wide array of connections, integrates smoothly into any system. Plus, it comes with PC software and a communication protocol for seamless handheld and multi-function system us.
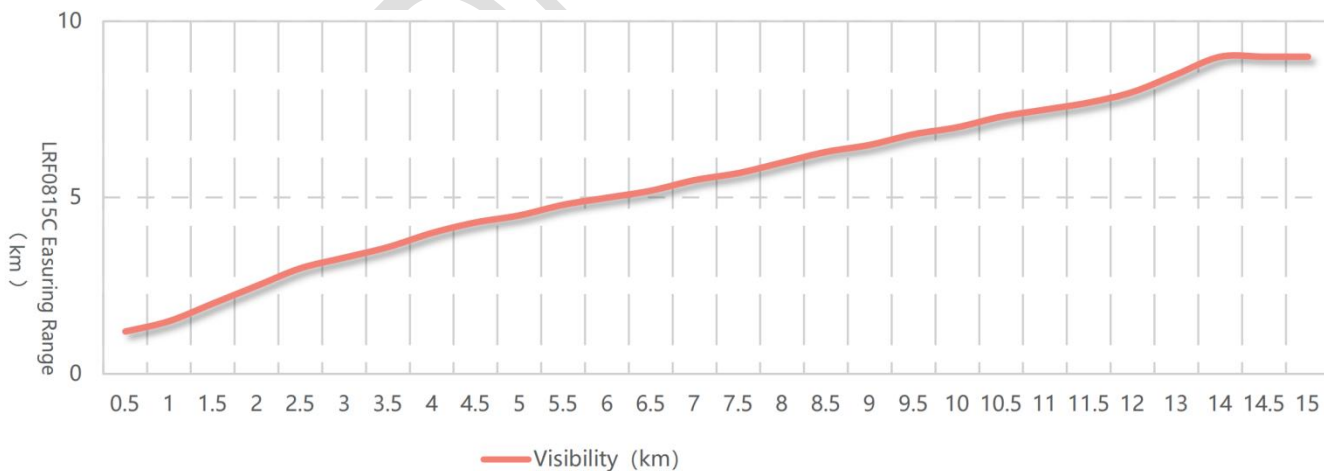
ᴙ FEATURES

- Single shot ranging and continuous ranging
- 3-target detection, front and back target indication
- Contain self-checking function
- Wake-on-lan function
- Number of emitted pulses during MNBF $\geq 1 \times 10^6$ times

ᴙ APPLICATIONS

- Handheld devices
- Unmanned aerial vehicle
- Electro-optical pod
- Border surveillance

## ᴙ TECHNICAL SPECIFICATIONS

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Project	Performance Indicators
Model	LRF0815C

Laser Wavelength		1.54μm±0.02μm
Eye Safety		Class I (IEC 60825-1)
Divergence Angle		≤0.35 mrad
Receiving Field of View (FOV)		~2.0 mrad
Launch Lens Diameter		Φ12mm
Receiver Lens Diameter		Φ40mm
Measuring Range (Reflectance 30%; visibility ≥ 16km.)	Big Target (4m×6m)	≥12000 m
	NATO goals(2.3m×2.3m)	≥ 8200 m
	People(0.5m×1.7m)	≥ 3000 m
	Drones(0.2m×0.3m)	≥1500 m
Minimum Range		50 m
Ranging Frequency		0.5~10Hz
Ranging Accuracy		±2 m
Range Resolution		≤30 m
Precision Rate		≥98%
False Alarm Rate		≤1%
Number of multi-target detections		Up to 3 targets
Electrical Interface		molex- 532610771
Supply Voltage		DC12 V
Standby power consumption		≤1.2W
Average power consumption		≤2 W
Peak Power Consumption		≤3W@10Hz
Weight		≤175g
Dimension (L×W×H)		65mm×46mm×86mm
Operating Temperature		-40 ~ +70 ℃
Storage Temperature		-55 ~ +75 ℃
Impact Resistance		1200 g/1 ms (GJB150.16A-2009)
Anti-vibration		5～50～5 Hz，1 Octave range /min，2.5 g
Ranging Logic		First and last target, multi-target ranging, distance selectivity
Activation Time		≤950 ms
Data Interface		TTL
Electrical isolation		Isolation of power ground, communication ground and structure ground
Reliability		MTBF ≥ 1500h
Optical axis stability		≤0.05 mrad
Non-parallelism between optical axis and mounting surface		≤0.5 mrad
Protection Class		IP67
ESD Class		(Lens position) Contact discharge 6kV Air discharge 8kV
Electromagnetic Compatibility (EMC)		CE/FCC Certification
Eco-friendly		RoHS2.0

⊒ STRUCTURAL DRAWING (mm)
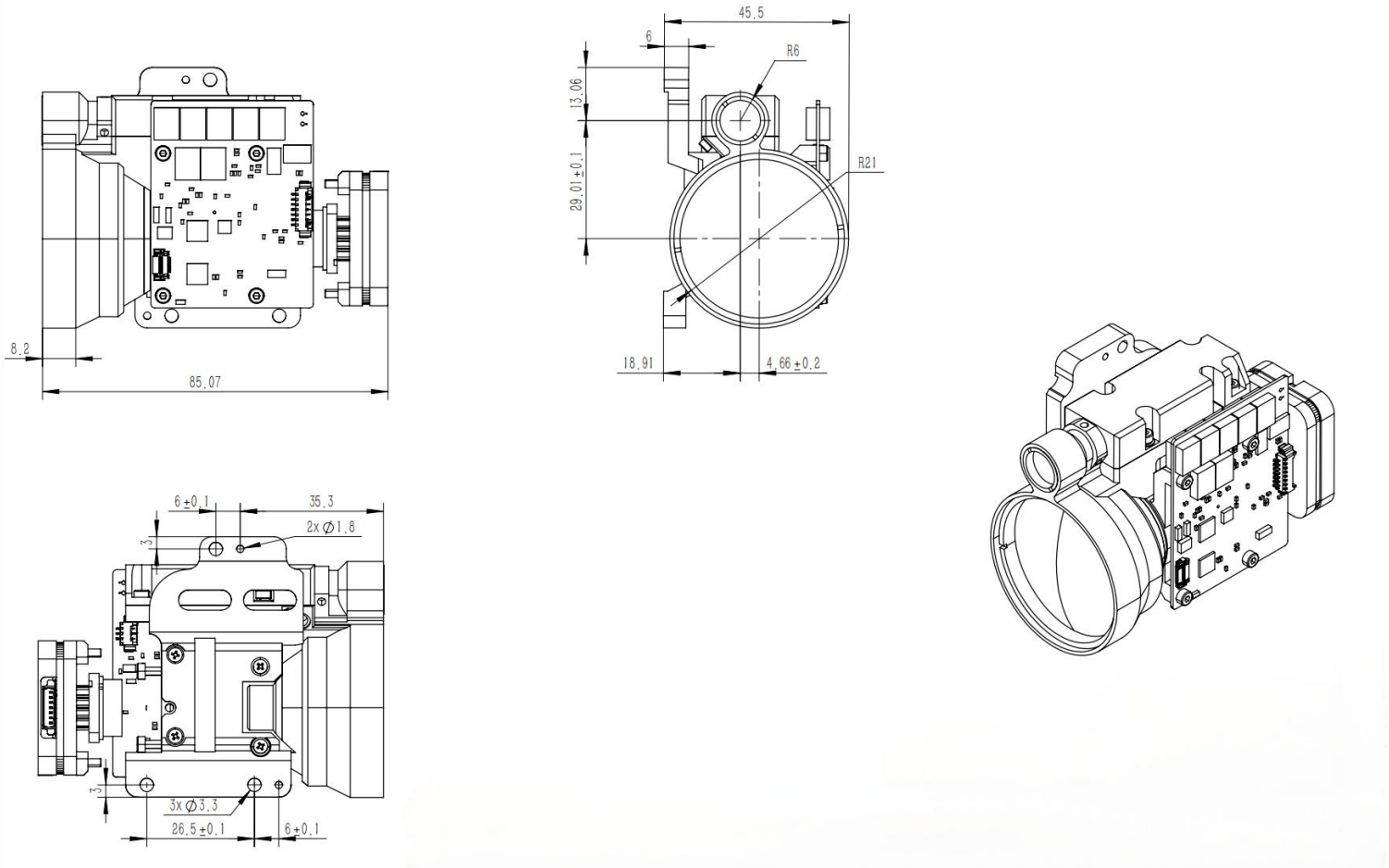
⊒ ELECTRICAL INTERFACE

Electrical connector model: Molex51021-0500. The detailed definition of the electrical interface is as follows:

Table 1 Interface definition

External plug-in XS3	Model：Molex51021-0500	Remark
1	TTL RX	3.3V
2	TTL TX	3.3V
3	CTRL	3.3V-5V power on, 0V power off
4	+5V	Positive power supply
5	GND	power supply ground

⊒ COMMUNICATION PROTOCOL

Communication format: TTL communication, baud rate 115200bps;
Data format: 8 bits of data, one start bit, one stop bit, no parity check, the data consists of header byte, command part, data length, parameter part, check byte;.
Communication method: The main control and the distance measuring machine adopt a master-slave communication method. The main control sends control commands to the distance measuring machine, and the distance measuring machine receives and executes the instructions. In the ranging state, the ranging machine sends back the data and status of the ranging machine to the host computer according to the ranging cycle. The communication format and command content are as shown in the table below.

- Master sending

The format of the sent message is as follows:

STX0	CMD	LEN	DATA1H	DATA1L	CHK

Send message format description

Table 2 Description of sending message format

No.	Name	illustrate	code	Remark
1	STX0	Message start flag	55(H)	
2	CMD	Command word	See table 3	
3	LEN	Data length	The number of all bytes except the start flag, command word, and checksum	
4	DATAH	parameter		
5	DATAL			
6	CHK	XOR check	Except for the validation byte, other bytes are XORed	

The command is described as follows:

Table 3 Description of commands and data words sent by the main control to the distance measuring machine

No.	command word	Functions	Data byte	Remarks	Length	sample code (computing)
1	0x00	Standby (continuous ranging stop)	DATAH=00（H）DATAL=00（H）	Distance measuring machine stops working	6 bytes	55 00 02 00 00 57
2	0x01	Single ranging	DATAH=00（H）DATAL=00（H）		6 Bytes	55 01 02 00 00 56
3	0x02	Continuous ranging	DATAH=XX（H）DATAL=YY（H）	DATA expresses the ranging period in ms.	6 bytes	55 02 02 03 E8 BE (1Hz ranging)
4	0x03	Self-test	DATAH=00（H）DATAL=00（H）		6 Bytes	55 03 02 00 00 54
5	0x04	Distance selection and nearest distance setting	DATAH=XX（H）DATAL=YY（H）	DATA expresses the blind zone value, unit 1m	6 Bytes	55 04 02 00 64 37 (100m closest)
6	0x06	Cumulative number of light out query	DATAH=00（H）DATAL=00（H）	Cumulative number of light out query	6 bytes	55 06 02 00 00 51
7	0x11	APD power on	DATAH=00（H）DATAL=00（H）		6 bytes	55 11 02 00 00 46
8	0x12	APD power off	DATAH=00（H）DATAL=00（H）		6 bytes	55 12 02 00 00 45
9	0xEB	Number Query	DATAH=00（H）DATAL=00（H）		6 bytes	55 EB 02 00 00 BC

- Master receive format

The receive message format is as follows:

STX0	CMD	LEN	DATAn	DATA0	CHK

Table 4 Description of receive message format

No.	Name	Description	Code	Remarks
1	STX0	Message start flag 1	55(H)	
2	CMD_JG	Data command word	See Table 5	
3	LEN	Data length	Number of all bytes except start flag, command word, and checksum	
4	Dn	Parameter	See Table 5	
5	D0			
6	CHK	Checksum	All bytes except parity byte	

Master receive status description:

Table 5 Description of the data word sent from the rangefinder to the master control

No.	command word	Functions	Data byte	Remarks	Total length
1	0x00	Standby (continuous ranging stop)	D1=00（H）D0=00（H）		6 bytes
2	0x03	Self-test	D7 ~D0	D0: char type, indicates APD temperature in degrees Celsius; D1: APD high-voltage value, unit V; D3-D2: blind value, unit 1m; D5-D4: -5V voltage, unit 0.01V. D7-D6:+5V voltage, unit 0.01V	12 bytes
3	0x04	Setting of the nearest distance to the opt-in, unit m	D1 D0	DATA expresses the closest distance value in 1m; First high then low	6 bytes
4	0x06	Cumulative number of light out query	D3~D0	DATA expresses the number of times the light is emitted, 4 bytes, the high byte comes first	8 bytes
5	0x11	APD power on	DATAH=00（H）DATAL=00（H）	APD with high voltage	6 Bytes
6	0x12	APD power off	DATAH=00（H）DATAL=00（H）	APD without high voltage	6 Bytes
7	0xED	Work timeout	0x00 0x00	The laser is in laser protection and cannot measure the distance.	6 bytes
8	0xEE	Validation error	0x00 0x00		6 bytes
9	0XEF	Serial communication timeout	0x00 0x00		6 bytes
10	0x01	Single Distance Measurement	D9 D8 D7 D6 D5 D4 D3 D2 D1 D0	D8-D6 first target distance (unit 0.1m) D5-D3 second target distance (data is 0 when single target) (unit 0.1m) D2-D0 third target distance (data is 0 when single target) (unit 0.1m) 3 target from near to far D9 (bit7-bit0) flag byte: D9 bit 7 indicates main wave; 1: with main wave, 0: without main wave. D9 bit 6 indicates return wave; 1: with return wave, 0: without return wave D9 bit 5 indicates the laser status; 1: laser normal, 0: laser failure D9 bit 4 timeout alarm; 1 normal, 0 timeout D9 bit 3 invalid, =1 D9 bit 2 indicates APD status; 1: normal, 0: error D9 bit 1 indicates whether there is a former	14 bytes

No.	command word	Functions	Data byte	Remarks	Total length
				target; 1: target, 0: no target (the target before the main target is the former target) D9 bit 0 indicates whether there is an after-target; 1: with target, 0: without target (the target after the main target is the after-target)	
11	0x02	Continuous distance measurement	D9 D8 D7 D6 D5 D4 D3 D2 D1 D0	D8-D6 first target distance (unit 0.1m) D5-D3 second target distance (data is 0 when single target) (unit 0.1m) D2-D0 third target distance (data is 0 when single target) (unit 0.1m) 3 target from near to far D9 (bit7-bit0) flag byte: D9 bit 7 indicates main wave; 1: with main wave, 0: without main wave. D9 bit 6 indicates return wave; 1: with return wave, 0: without return wave D9 bit 5 indicates the laser status; 1: laser normal, 0: laser failure D9 bit 4 timeout alarm; 1 normal, 0 timeout D9 bit 3 invalid, =1 D9 bit 2 indicates APD status; 1: normal, 0: error D9 bit 1 indicates whether there is a former target; 1: target, 0: no target (the target before the main target is the former target) D9 bit 0 indicates whether there is an after-target; 1: with target, 0: without target (the target after the main target is the after-target)	14 bytes
14	0xEB	Number Search	D16…… D0	D15 D12 Complete model D11 D10 Product number D9 D6 Software version D5 D4 APD number D3 D2 Laser number D1 D0 FPGA version	20 bytes

Remarks: ① Undefined data byte/bit, default is 0;